A/D

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/934,803	08/22/2001	Michael Heiberger	71711	9359

22242 7590 08/22/2002

FITCH EVEN TABIN AND FLANNERY
120 SOUTH LA SALLE STREET
SUITE 1600
CHICAGO, IL 60603-3406

EXAMINER
MULLINS, BURTON S

ART UNIT	PAPER NUMBER
2834	

DATE MAILED: 08/22/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/934,803	HEIBERGER ET AL.	
	Examiner	Art Unit	
	Burton S. Mullins	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *2&3* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 3-4 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. It is not clear how one of ordinary skill would choose a suitable spring constant for the flexible, solid material to "govern" the pressure between the brush and the rim (claim 3) or "permit a preload pressure on the armature conductor turn to remain substantially constant as the material exhibits limited wear and deflection from external forces" (claim 4). No specific spring constants for the brushes are disclosed. The specification describes on p.12, line 32-p.13, line that "[t]he current collectors 132 are configured to exhibit a spring rate that results in an applied pressure on the armature conductor turn 120...." It is not clear what spring rate achieves this function, as no specific suitable spring constants are provided, either for copper fiber or copper foil brushes. Neither is it clear that the brush spring constant alone is responsible for controlling pressure. The "configuration" of the brush collectors includes brush shape or particular brush mount, both of which may have an affect on the applied pressure on the conductor turn. In the specification p.13, lines 7-23, it is suggested that flux return geometry, field coil configuration or a controlled atmosphere can contribute to the pressure. One of ordinary skill in the art would not understand from the specification how to

choose between one or a combination of these various possibilities for controlling the pressure between the brush and rim and thus fulfilling the functions in claims 3-4.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Smith (US 5,821,659). Smith teaches a homopolar machine comprising: shaft 11; an armature 15 coupled to shaft 11 and including plural conductor turns 21; outer flux return (shielding 49 with flux represented by arrows 51) enclosing the armature; plural stator-current collector arrays (slip rings 23) coupled to outer flux return and encircling the armature; each array including plural current collectors (slip ring brushes 23) in contact with the armature conductor turns 21 in the presence of high magnetic fields 51 to provide a sliding electrical current interface with the turns (c.2, lines 34-41).

Regarding claim 2, a portion (not numbered) of the outer flux return 49 directs magnetic field lines 51 substantially parallel to the (radially-directed) current flowing at the interface between collectors 23 and conductor turns 21.

Regarding claim 3, the brushes 23 inherently comprise "flexible, solid material" which bears against the respective outer conductor turn 21 "with a pressure governed substantially by a spring constant of the flexible, solid material."

5. Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Stillwagon (US 4,271,369). Stillwagon teaches a homopolar machine comprising: shaft (not numbered); an armature comprising hollow cylinders 18 coupled to the shaft and including plural conductor turns (slip rings 38); outer flux return (stator 12) enclosing the armature; plural stator-current collector arrays (parallel, cylindrical conductors 72, c.6, lines 34-37) coupled to outer flux return and encircling the armature; each array including plural current collectors (brushes 40) in contact with the armature conductor turns via slip rings 38 in the presence of high magnetic fields (flux lines in Fig.2) to provide a sliding electrical current interface with the turns (c.6, lines 40-45; Figs.2-3).

Regarding claim 2, a portion of the flux path travels parallel to the current flowing at the interface between brushes and slip rings.

Regarding claim 3, the brushes inherently comprise "flexible, solid material" which bears against the respective outer conductor turn "with a pressure governed substantially by a spring constant of the flexible, solid material."

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 4-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith or Stillwagon in view of Kuhlmann-Wilsdorf et al. (US 6,245,440). Smith and Stillwagon do not teach details of the current collector brushes (claims 5-8). Kuhlmann-Wilsdorf teaches metal fiber and foil brushes with low heat generation and low sliding wear rate comprising copper and copper alloys (c.10, lines 12-19; c.18, lines 30-36 and 50-64). Such brushes are applicable to high-current applications (c.24, lines 14-21). Regarding claim 4, brush preload pressure is recognized by Kuhlmann-Wilsdorf in that the advantage of brush fiber "spring" is suggested (c.13, line 67-c.14, line 2) and constant brush force is taught as being desirable for proper operation (c.24, lines 14-29). The force is kept constant by hydrostatic means employing liquid metal used at the same time for conducting current to and from the brushes (c.24, lines 45-61).

It would have been obvious to one having ordinary skill in the art to modify Smith or Stillwagon and provide brushes per Kuhlmann-Wilsdorf because brushes with low heat generation and sliding wear rates would have been desirable.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Burton S. Mullins whose telephone number is 305-7063. The examiner can normally be reached on Monday-Friday, 9 am to 5 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on 308-1371. The fax phone numbers for the organization where this application or

proceeding is assigned are 305-1341 for regular communications and 305-1341 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-0956.

Burton S. Mullins
Primary Examiner
Art Unit 2834

bsm
August 14, 2002